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# Knowledge, Skills, and Thought Processing of the Battalion Commander and Principal Staff Officers

Theodore R. Powers and Arthur J. DeLuca



HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314



July 1972

Prepared for

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1. The general objective of this work unit was to produce information that would aid the long-range curriculum revision program at the U.S. Army Infantry School with systematic derivation of course content as a major element. This report describes the research that was conducted to identify the knowledge, skills, and thought processes of the battalion commander and his principal staff officers.

2. Job analysis procedures were followed to develop statements of the knowledge and skills requirements of the battalion officers (the findings for the specific jobs -- Battalion Commander, S1, S2, S3, S4 -- are reported in five separate annexes). It was found that knowledge and skills can be identified and ranked in importance, providing definite guidance to the curriculum planner. It was determined that, generally, the staff apparently processes requirements, in the area of thought processing, in a specific and predictable way. It was concluded that a systematic job analysis procedure can be used to identify the knowledge and skill requirements, that they can be ranked as to their importance and used to validate instructional programs and curriculum revisions, and that a simulated battalion CPX is a feasible approach for initial examination of thought processing.

3. This report should be of interest to those in areas of curriculum development, job analysis, systems engineering, and leadership and training.

FOR THE CHIEF OF RESEARCH AND DEVELOPMENT:

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13. ABSTRACT

This report describes research accomplished to aid the U.S. Army Infantry School in its systems engineering of the Infantry Officers Advanced Course curriculum. The research focused on the identification of the knowledge and skills and the study of thought processing of the battalion commander and his four principal staff officers (S1, S2, S3, S4). A survey of these officer activities was conducted in over 80% of all combat maneuver battalions, and data produced by a simulated battalion CPX were analyzed. It was concluded that it is feasible to identify knowledge and skills for commanders and staff officers by conducting a systematic job analysis, to use this information in the systems engineering of a curriculum, and to initially investigate thought processing by using a CPX. However, in the latter case definitive results should be developed by further experimentation.

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HUMAN RESOURCES RESEARCH ORGANIZATION

Work Unit CAMBCOM

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Washington, D.C. 20310

The Human Resources Research Organization (HumRRO) is a nonprofit corporation established in 1969 to conduct research in the field of training and education. It is a continuation of The George Washington University Human Resources Research Office. HumRRO's general purpose is to improve human performance, particularly in organizational settings, through behavioral and social science research, development, and consultation. HumRRO's mission in work performed under contract with the Department of the Army is to conduct research in the fields of training, motivation, and leadership.



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# FOREWORD

This report describes the research conducted by the Human Resources Research Organization under Work Unit CAMBCOM. This Work Unit had as its general objective the production of information that will aid curriculum revision at the U.S. Army Infantry School. The research reported in this document describes work that was conducted during 1968-70 to identify the knowledge, skills, and thought processes of the battalion commander and his principal staff officers. The information supplied by this research is currently being used in curriculum revision at The Infantry School and has been used by other Army service schools for informational purposes.

Although this report describes the events that took place during the research process and presents certain data for illustrative purposes, the reader should note that, because of the amount, scope, and complexity of the material, the complete data from this project are reported in five separate annexes that have been previously prepared.

The research described in this report was conducted by HumRRO Division No. 4 at Fort Benning, Georgia. The Division Director is Dr. T.O. Jacobs. The HumRRO research team that developed this information included Mr. Theodore R. Powers, Work Unit Leader, and Mr. Arthur J. DeLuca. The U.S. Army Infantry Human Research Unit commanded by LTC Chester I. Christie provided Sp4 Richard Winslow and Sp5 James Summers as military support.

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Meredith P. Crawford
President
Human Resources Research Organization

# SUMMARY AND CONCLUSIONS

## MILITARY PROBLEM

During the past several years, the U.S. Army Infantry School (USAIS) has been concerned with the implementation of a five-year Master Plan directed primarily toward improving instructional content and procedures. The Plan includes the introduction of innovations in technology of instruction and emphasizes the systematic derivation of training content as a critical first step in the establishment of any instructional system. As direct support to the implementation of this Plan, the USAIS requested that HumRRO establish a research project that would identify the knowledge and skills and examine the thought processing of the battalion commander and his principal staff officers (S1, S2, S3, S4).

## OBJECTIVES OF THE STUDY

The identification of the knowledge and skills and the examination of thought processing[1] of the battalion commander and his principal staff would support the USAIS Master Plan in three areas. These are:

(1) Validate that portion of the Infantry Officer Advanced Course (IOAC) curriculum (2-7-C22) that is devoted to battalion commander and staff functions.

(2) Develop a quantitative basis for the derivation of Student Performance Objectives for IOAC subject matter as prescribed by CONARC Reg 350-100-1.

(3) Serve as a basis for revision of USAIS literature concerning the battalion commander and staff.

## APPROACH

The first step in the accomplishment of these objectives involved the identification of the knowledge and skills of the principal battalion staff officers. This was accomplished by using a modified U.S. Air Force job analysis procedure to develop a knowledge and skills inventory for use in surveying the activities of battalion staff officers. The inventory was sent to officers in more than 80% of all combat maneuver battalions located in CONUS, Europe, Alaska, Panama, Hawaii, Korea, and Vietnam. Battalions that had as their primary mission the support of activities at a U.S. Army Service School and battalions having an unstable geographical location at the time of the survey were excluded. The results of this research not only provided information concerning the battalion staff, but also indicated that, in general, similar procedures could be used to collect data concerning the battalion commander.

The development of a knowledge and skills inventory for the battalion commander proved to be more complex because the job had more of an executive level orientation than a specialist orientation that is present in the staff positions. Nevertheless, a

[1] Thought processing, as used in this report, refers to how the battalion commander and his staff officers interface with events and organize their implications in a generalized process that can be applied in varied situations.

knowledge and skills inventory was developed and used in surveying the activities of battalion commanders. It was sent to more than 85% of the battalion commanders located in CONUS, Europe, Alaska, Panama, Hawaii, Korea, and Vietnam.

Slightly over half the inventories were returned. The rate of return for the various types of the battalions and geographical locations, when analyzed, was such that the results obtained were considered representative of the population.

Concurrently with this work, the thought processing of the battalion commander and his staff was examined using a simulated CPX developed and conducted by the staff of Work Unit FORGE. This phase of the research generated a theoretical model to explain thought processing, tested the model on the FORGE CPX, and developed several conclusions about how thought processing may take place on the staff of the maneuver battalions.

## RESULTS

The detailed results of this study are presented in five volumes of data, each describing the findings for a specific job (Battalion Commander, S1, S2, S3, S4). In general, it was found that knowledge and skills can be identified and ranked in importance, thus giving definite guidance to the curriculum planner.

In the area of thought processing, it was determined that, in general, the staff apparently processes requirements in a specific and predictable way. The demands imposed upon the commander necessitate some of this behavior but they also require some unique behavior that would not necessarily be entirely predictable.

## CONCLUSIONS

(1) A systematic job analysis procedure can be used to identify the knowledge and skill requirements for both battalion commanders and their principal staff officers.

(2) Knowledge and skills can be ranked as to their importance and, thus, can be used to validate programs of instruction, fulfill curriculum revision demands required by higher headquarters, and revise student literature as appropriate.

(3) A simulated battalion CPX is a feasible approach for making an initial examination of thought processing as it relates to the battalion commander and his four principal staff officers. Further research in this area is necessary if definitive results are required.

# CONTENTS

# Knowledge, Skills, and Thought Processing of the Battalion Commander and Principal Staff Officers

# INTRODUCTION

## MILITARY PROBLEM

Within the past several years, much interest has been generated in both civilian and military educational communities in the systematic derivation of training content as a critical first step in the establishment of an instructional system. This emphasis is demonstrated in the Army sphere by the publication in 1966 of CONARC Pamphlet 350-15, *Student Performance Objectives* (1), and in 1968 of CONARC Regulation 350-100-1, *Systems Engineering of Training (Course Design)* (2).

This high-level emphasis on systems engineering caused all service schools to implement a long-range program to reassess their basic instructional systems. At the U.S. Army Infantry School (USAIS), these requirements led to the development of a five-year Master Plan that stressed the introduction of innovations in the technology of instruction and emphasized the systematic derivation of course content. As direct support to this plan, HumRRO Division No. 4 was requested by the USAIS to assist in identifying the knowledge, skills, and thought processing of the battalion commander and his principal staff officers (S1, S2, S3, S4).

To focus the research in the appropriate areas, the USAIS offered the following guidelines to the research staff:

(1) The research should include only those battalions classed as combat maneuver battalions—Infantry, Mechanized Infantry, Light Infantry, Airborne Infantry, Airmobile Infantry, and Tank Battalion.

(2) The scope of the research would encompass only the battalion commander and his four principal staff officers (S1, S2, S3, S4). The battalion executive officer and, if assigned, the S5 (Civil Affairs Officer) would not be included in the research since the USAIS does not have primary responsibility for their training.

## OBJECTIVES OF THE STUDY

There were three primary objectives for the research that is reported here. Information developed should enable the USAIS to:

(1) Validate that portion of the Infantry Officer Advanced Course (IOAC) curriculum that is devoted to battalion commander and staff procedures.

(2) Develop a quantitative basis for the derivation of Student Performance Objectives for IOAC subject matter as prescribed by CONARC Regulation 350-100-1.

(3) Serve as a basis for revision of USAIS student literature concerning the battalion commander and staff.

## RESEARCH APPROACH

With the establishment of the research requirements, Exploratory Research 64 (ER-64) was initiated to assess the feasibility of accomplishing research in this area.

During the early stages of ER-64, it became evident that because of the qualitative differences between the concepts of thought processing and the relatively more tangible factors of knowledge and skills, eventually two different methods of gathering data for these areas would evolve. This assumption proved to be correct, and in this report, the methods of gathering data for the two different factors of thought processing and of knowledge and skills are presented and discussed separately.

One major objective of ER-64 was to find the job analysis method that had the greatest potential for systematic collection, quantification, and organization of information about the job requirements of the battalion commander and his staff. An off-the-shelf method of analysis was sought since the projected time frame of the exploratory research and resultant Work Unit would not permit the development and testing of a new procedure.

To initiate this phase of the research, a literature survey was conducted that revealed the basic types of information-gathering methods used to identify knowledge and skill requirements. To judge the appropriateness of these various methods and to reflect the resources that would eventually be available to the Work Unit, the following criteria for selection of a job analysis method were developed:

(1) Direct observation of the job incumbent would not be a critical requirement of the procedure.
(2) Procedure could be concurrently applied to several different types of jobs at the same time.
(3) Procedure would not only identify types of job information, but would also be capable of making hierarchical judgments as to their importance.
(4) The time required for the administration and scoring of the procedure would easily fit within the time frame of the Work Unit.

The criteria were applied to numerous job analysis procedures, not only those used by the military services, but also those developed for use in private industry. It was determined that most of them did not qualify on one or more criteria.

However, a job analysis procedure that had originally been developed for use by the U.S. Air Force (3, 4) not only met all the judgmental criteria, but offered several advantages as well. First, it originally had been developed to identify tasks in a military environment; second, it offered established administrative procedures that had been successfully applied in a military environment; and third, its support and technical requirements were within the capability of the Work Unit. A general outline of the procedure is shown in Figure 1.

## Job Analysis Method

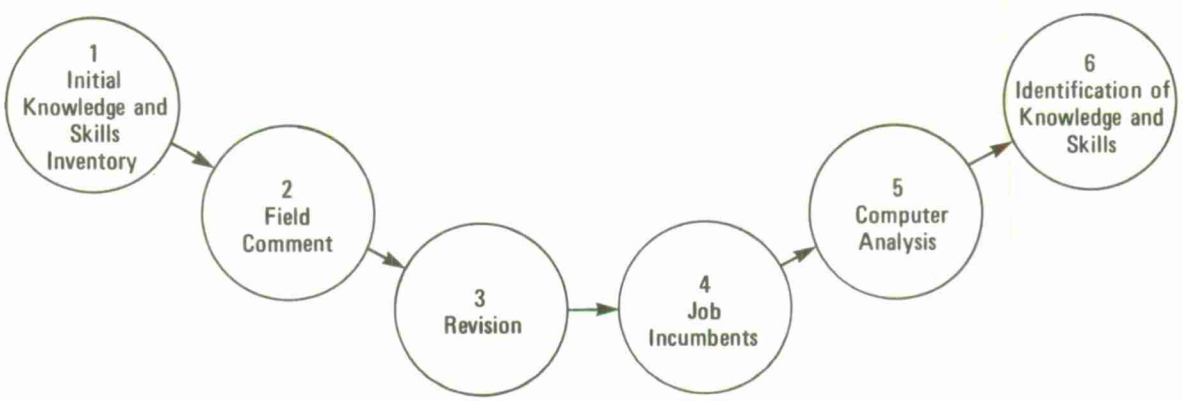


Figure 1

Step 1 in this procedure involved developing a "tentative" knowledge and skills inventory. This was accomplished by making a tentative list, using existing literature, and then having the list reviewed by technical experts. Step 2 involved submitting the revised "preliminary" list to the field for comment by job incumbents. The list was then returned to the research staff. In Step 3, the preliminary list was revised to reflect the field comment and a "final" list derived. In Step 4, the list was sent to the field for completion by job incumbents, and in Step 5, the information was subjected to computer analysis. Step 6 consisted of using the results of the computer analysis to develop usable job information. In the current research, this terminal step involved the identification of knowledge and skills for the battalion commander and his staff.

## APPROACH TO THOUGHT PROCESSING

There have been some noteworthy efforts to categorize thinking and to conduct research on mental processes (5, 6, 7). However, much of this work has been conducted in the laboratory, and it has been difficult to generalize the results to a real-life situation. The term "thought processing," as used in this report, refers specifically to how the battalion commander and his staff officers interface with events and how they organize or structure the implications of those events in a generalized process that can be applied in a wide variety of situations.

Discussions with the USAIS indicated that their interest in the thought process area was not in identifying the basic attributes of thinking, but, rather, in knowing more about how mental processes operate within the framework of the battalion staff. Using this guidance, some of the possible environments in which information of this type might be collected were examined.

It was found that the staff of Work Unit FORGE of HumRRO Division No. 4 faced similar questions. The FORGE staff has the mission of identifying and obtaining better understanding of the human factors that influence performance of command and control functions in military organizations. To attack this problem, FORGE personnel chose a simulated battalion command post exercise (CPX) as their primary data-gathering vehicle. The CPX also seemed to meet the needs of CAMBCOM in that (a) a functioning battalion staff system would be operating, (b) rigorous experimental controls would be applied, and (c) inputs to the system would be carefully controlled; thus, interactions and outputs by the commander and staff officers could be identified and studied.

The determination of a job analysis procedure to identify knowledge and skills and the selection of a data-gathering vehicle to investigate thought processing signaled the termination of the exploratory research. Work Unit CAMBCOM (Combat Arms Maneuver Battalion Command) was activated and carried out the research that is reported in this document.

## PROCEDURE

The first step in the research consisted of identifying the knowledge and skills of the battalion commander and his staff. It had been determined during the terminal stages of the exploratory research that although a great deal of material describing the activities of the staff was in existence, very little was available that discussed the job of the commander in specific detail. Since the job analysis method to be used required that a tentative list of knowledge and skills be prepared from existing information, it was decided that the initial effort of data collection should be aimed at the staff.

The first step in the job analysis procedure involved developing a tentative knowledge and skills inventory for each staff position (S1, S2, S3, S4). This required survey of written sources of material—Field Manuals, Programs of Instruction, Army Subject Schedules, and service school publications.

The list developed from the written sources was then taken to the Brigade and Battalion Operations Department (BBOD) of the USAIS, and personnel from the Staff Group (Personnel, Intelligence, Operations and Training, and Logistics Committees) commented on each list. In general, this involved determining whether each knowledge and skill was appropriate for inclusion on the list and making suggestions of other knowledge and skills that should be added.

At this point in the research, it became apparent that although there was general agreement as to what a staff officer did, there were no quantitative data that clearly defined how often a specific knowledge and skill was accomplished, how difficult it was to accomplish it, and how important it was within the total job picture. The development of these specific data, then, became one of the major objectives of the research.

The second step in the development of knowledge and skills information involved sending the preliminary lists to the field for comment. Twelve combat maneuver battalions located in the Continental United States (CONUS), Canal Zone, Europe, Hawaii, Alaska, and Vietnam were selected by the Continental Army Command (CONARC) for survey purposes. The staffs of these battalions were asked to supply the required information, and write-in comments were encouraged.

Each knowledge and skills inventory returned was assessed by the research staff. A major judgment area was whether a field comment reflected local job variation rather than differing requirements for knowledge and skills instruction. Results of the assessment determined that the preliminary lists were, in general, valid instruments of data collection, but that minor refinements were needed. In addition, the research staff reviewed, revised, and finalized administrative procedures for sending and receiving inventories.

## DEVELOPMENT OF STAFF OFFICER FINAL KNOWLEDGE AND SKILLS INVENTORY

The final knowledge and skills inventory consisted of a basic format upon which data concerning specific staff officer functions could be entered. The format is shown in Figure 2. There are six major columns plus the requirement for two categories of information in the lower left-hand corner. Column 1 lists the Object. In the example, this is the subject of "Replacements." There was general agreement that the S1 had something to do with replacements; but exactly what, how often, how difficult, and how important were items that lacked quantitative data. Column 2 contains a list of specific actions that could be taken in the replacement area. The instructions were that if a specific action were taken, then the information in columns 3, 4, 5, and 6 should be supplied. If the staff officer was not involved with this action at all, he was instructed to draw a line through it indicating a negative response. The respondents were further requested to write in exactly what they did and supply required quantitative information for any action that was not listed.

Columns 3 through 6 contain requirements to produce quantitative data for each action in column 2. Column 3 simply requires that the staff officer indicate how frequently he does the required action. Column 4 requires that the respondent indicate on a relative scale[1] of 0 to 10 how much time is involved in the action. Column 5

[1] During the ER, actual time unit scales were used during some pilot tests. Scales of this type proved to be unacceptable, because the data derived from them had little consistency among subjects.

**Basic Format for Staff Officer Knowledge and Skills Inventory**

| 1 | 2 | 3 | | | | | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| | | How Often | | | | | How Much Time | How Difficult | How Important |
| OBJECT | ACTION | Daily | Weekly | Monthly | Quarterly | Infrequently | 10—a lot<br>8—<br>6—<br>4—<br>2—<br>0—very little | 10—very hard<br>8—<br>6—<br>4—<br>2—<br>0—very easy | 10—greatest<br>8—<br>6—<br>4—<br>2—<br>0—very little |
| Replacements | a. brief | | | | | | | | |
| | b. determine priorities | | | | | | | | |
| | c. welcome | | | | | | | | |
| | d. confer w/ Bn S3 re: | | | | | | | | |
| | e. confer w/ Bn S4 re: | | | | | | | | |
| | f. confer w/ Bn CO re: | | | | | | | | |
| | g. confer w/ Unit CO re: | | | | | | | | |
| | h. confer w/ Bde S1 re: | | | | | | | | |
| | i. confer w/ Div AG re: | | | | | | | | |

Where learned? School _____ OJT _____

Should be learned: School _____ OJT _____

Figure 2

requires a judgment of how difficult the action is on the same type of relative scale. Column 6 requires a judgment on the importance of the action. The respondent filled in each of these columns with the appropriate numbers, and this information was combined into the basic data of the study.

The information requested in the "Where Learned" and "Should be Learned" categories refers to the Object listed at the top of the figure (e.g., Replacements). The staff officer was asked to indicate exactly where he had received instruction on this subject (i.e., a formal service school or on-the-job instruction). He was then asked to give his opinion as to where this particular subject matter should be learned. It was anticipated that this portion of the data could be used as supplemental information for determining appropriate teaching context.

## DEVELOPMENT OF BATTALION COMMANDER FINAL KNOWLEDGE AND SKILLS INVENTORY

The development of knowledge and skills inventories for battalion commanders closely followed the development pattern used for staff officers. That is, tentative knowledge and skills lists were developed, revised to reflect comments by the USAIS, assessed in a field pilot study, and eventually modified for a final list.

However, early in the research process it became apparent that the job of the battalion commander would be a more difficult position to assess, since the requirements for this type of job were focused in the executive areas where previous research had indicated that job analysis is relatively difficult. This difficulty in identifying requirements is due, in part, to the nebulous nature of executive jobs and, in part, to the fact that men holding these positions must become interested in all areas that have an impact upon an organization, even if only a minimal interest is required.

Defining the knowledge and skill requirements for the battalion commander thus involved collecting quantitative data in a somewhat different form than that used for the staff officer. Previous research (8) had shown that the Hemphill "part-of-the-position scale" was able to reflect a combination of importance, criticality, and time spent. Also, along with acceptable reliability, this type of scale was apparently well received by the respondents. Therefore, in the battalion commander survey, a single 10-point scale was utilized to ask the respondents how much particular objects were "part-of-the-position."

On this scale, the number 1 indicates that an object, "Under unusual circumstances, may be a minor part of the position," while the assignment of number 10 would indicate an object that was "A most significant part of the position." Intermediate numbers indicate some degree of involvement between these extremes.

The instructions also specified that if the respondent was not involved with the object in any way, he should enter the numeral 0 (zero); this would identify objects that were not part of the position. An example of this type of knowledge and skills inventory is shown in Figure 3.

In addition to the assessment of knowledge and skills, the battalion commander inventory contained several sections of general data. This type of information ranged from a determination of the capabilities of battalion staff to a request to identify the situation that was making greatest demands on his leadership. These data were presented in open-end question form, and the battalion commanders were requested to write in their answers. Although much of the general information supplied was anecdotal and personal in nature, some of it proved valuable in developing a realistic picture of some of the demands that are made upon the battalion commander today.

## PROCESSING AND RETURN OF INVENTORIES

The final staff officer inventories were submitted to the staff of 171 combat maneuver battalions, while somewhat later, the battalion commander inventories were submitted to the commanders of 161 battalions.[1] This sampling covered officers in more than 80% of all combat maneuver battalions located in CONUS, Europe, Alaska, Panama, Hawaii, Korea, and Vietnam. Battalions that had as their primary mission the support of activities at a U.S. Army Service School and battalions having an unstable geographical location at the time of the survey were excluded.

[1] This reduction in the number of battalions directly reflects a reduction in Army size during the 10 months intervening between the staff officer survey and the battalion commander survey.

## Battalion Commander K-S Inventory: Logistics

Listed below are various OBJECTS in the area of LOGISTICS. As you read each OBJECT, consider whether or not you are personally involved with it. If you are, place a check (✓) in the first column on the right side of the page. If you are not, draw a line through it and leave the column blank. When you have completed this action, go back to the first item and indicate the extent each is "Part-of-the-Position" of battalion commander by writing a number in the column opposite each item. The rating scale is reprinted below for immediate reference.

| | |
|---|---|
| 1 | Under unusual circumstances, may be a minor part of the position |
| 2 | – |
| 3 | – |
| 4 | – |
| 5 | A substantial part of the position |
| 6 | – |
| 7 | – |
| 8 | – |
| 9 | – |
| 10 | A most significant part of the position |

| | OBJECT | Check if Involved | PART-OF-THE-POSITION |
|---|---|---|---|
| 1. | Report of Survey | | |
| 2. | Statement of Charges | | |
| 3. | Quarterly Report of Operational Loss | | |
| 4. | Cash Collection Voucher | | |
| 5. | DA Form 2765, 2765-1, or DA Form 1150 | | |
| 6. | Hand Receipt File | | |
| 7. | Due-In Suspense File | | |
| 8. | Document Register | | |
| 9. | Document File | | |
| 10. | Organizational Property Book | | |
| 11. | Installation Property Book | | |
| 12. | Prescribed Load List | | |
| 13. | Etc. | | |

Figure 3

To reflect the existing maneuver battalion profile, quotas were generated to build a sample roughly proportional to the maneuver battalion population as to (a) type of battalion and (b) specific geographical location. Within any one quota, selective choice sampling was used rather than random selection, because of various administrative and technical considerations.[1]

[1] The exact sampling profile for this survey contains information that is classified; thus it is not included in this unclassified report.

The number of inventories sent, returned, and unusable because of incorrect completion, and the percent of usable returns for each position are shown in Table 1. A comparison of the types of battalions and geographical locations of personnel who returned inventories versus personnel who did not return inventories showed no indications of bias in the returned material; thus it is assumed that the results obtained are representative of the population.

Table 1

**Inventories Sent and Returned per Position**

| Job | Sent | Returned | Unusable Returns | Usable Returns | Percent of Usable Returns |
|---|---|---|---|---|---|
| S1 | 171 | 105 | 10 | 95 | 55 |
| S2 | 171 | 105 | 13 | 92 | 53 |
| S3 | 171 | 82 | 6 | 76 | 44 |
| S4 | 171 | 87 | 3 | 84 | 49 |
| Battalion Commander | 161 | 87 | 0 | 87 | 54 |

## DEVELOPMENT OF THOUGHT PROCESSING INFORMATION FOR THE COMMANDER AND STAFF

The development of thought processing information for the commander and staff was primarily accomplished by utilizing the data collection effort of Work Unit FORGE. The FORGE staff has the general mission of studying organizational effectiveness; in accomplishing this, they developed a simulated battalion command post exercise (CPX) that utilized well-controlled experimental variables.

This exercise was based upon a simulated airmobile assault in Vietnam and involved 12 student players, all experienced staff officers. The players were given an initial briefing on one day and then were required to participate in the exercise on the following day. The exercise was well structured for control purposes with all verbal conversations being recorded and all written communications being copied. As the simulated tactical exercise developed, numerous "probes" were initiated by a control group. These probes were generally in the form of requirements, and in this way a general direction was given to the CPX. The voluminous data collected by the CPX will be reported in various documents produced by the staff of Work Unit FORGE. However, for CAMBCOM purposes, these data were analyzed in an attempt to explore thought processing of a battalion commander and his staff.

The term "thinking" can refer in a general sense to the process by which individuals apprehend or become aware of what is going on around them. The term "thought processing," as used in this report, refers specifically to how the battalion commander and his staff officers interface with events and how they organize or structure the implications of those events in a generalized process that can be applied in a wide variety of situations. This search for a generalized process led to the CAMBCOM model that is shown in Figure 4.

Looking at Figure 4 from left to right, it can be seen that events occur (these may be enemy action, friendly action, or simple administrative requirements) that cause requirements to be initiated from two primary sources. The first is labeled "Command

## Thought Processing on the Battalion Level

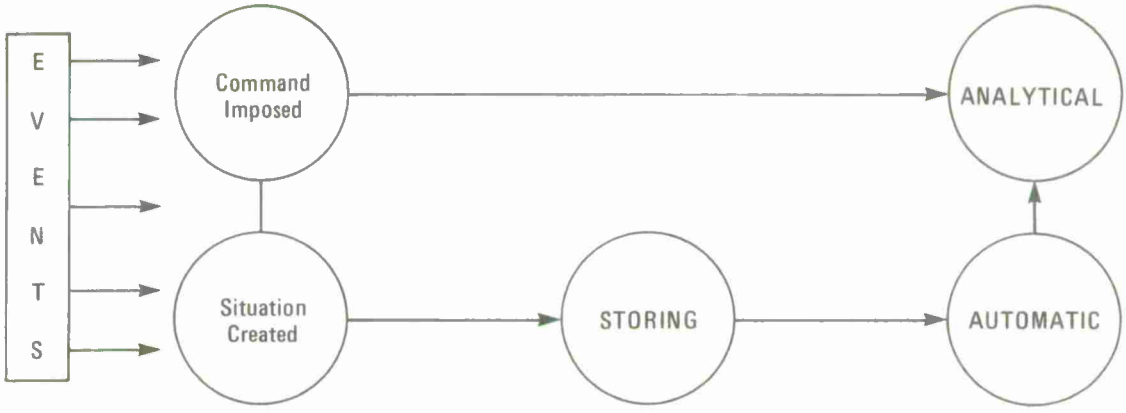


Figure 4

Imposed," and this refers to a requirement imposed by a higher headquarters. In the FORGE-designed CPX, this requirement usually came from brigade level. The second source of requirements is labeled "Situation Created." Again, in the context of the CPX, this indicated an area in which a requirement was generated by the situation and was mediated by company-level personnel.

These requirements generated a stream of events that necessitated action at the battalion level. This action was categorized into three behavior patterns. The first of these to occur was the "Storing" response. Storing, in this context, means that the communication input was simply accumulated in some form (sometimes in the mind, but more often recorded on a map or entered in a file) with no immediate action required. A common bit of communication that elicited a Storing response was the routine report of grid coordinates for a specific location. The decision as to whether a bit of information is of the storing type was usually inherent in the communication. That is, most of the communications were either directive (and these included requests from subordinates) or nondirective in nature; thus, no real decision-making is required at this point.

The second category of behavior pattern was the "Automatic" response. This identifies an activity in which the stimulus automatically activates systems that lead to prepatterned reactions, because of training and experience. This means that when an officer receives a request, he knows what to do and does it. An example would be an S4 receiving a request for Class III supplies. His reaction to a request of this type would be mainly automatic, because he would know the sequence of events that must be initiated for the requesting agency to eventually receive the needed supplies.

The third category of response was labeled "Analytical." This is a very complex area, and is the area that most people would probably include in the category of thinking. In the Analytical response, a request is examined by several people, and several possible decisions are suggested, in contrast to the Automatic type of response in which an immediate decision is made, usually by one person. This analytical type of response requires that the officer examine various alternatives in order to select the one that would apparently solve the requirement. Recall, experience, education, training, sensing, judgment, imagination, and perhaps fantasy are all integrated in the application of this behavior. Table 2 lists the major variables differentiating between Analytical and Automatic responses.

Thus, using the model shown in Figure 4 as the method of categorization and a simulated CPX as the data collection vehicle, a study of thought processing was conducted on the battalion staff.

Table 2

**Major Variables Differentiating Between Analytical and Automatic Responses**

| Variable | Automatic Response | Analytical Response |
|---|---|---|
| Number of personnel directly involved in action | 1 | 2 or more |
| Proposal of several possible alternatives | No | Yes |
| Time delay between request and reaction | None | Some |

# RESULTS

## BATTALION STAFF KNOWLEDGE AND SKILLS INVENTORY

The detailed results of the battalion staff officer knowledge and skills research are presented in four separate annexes that have been previously issued.[1] These documents present the quantitative results for each staff officer separately. Within any one document, the individual objects and actions are analyzed and discussed and there is an overall view of the job requirements for each staff officer position. An example of this type of analysis is presented in Figure 5.

A summary view of the results of the staff officer survey is extremely difficult to develop since over 2000 knowledges and skills were assessed. However, the research did produce general rankings for the Objects, and the following four tables identify those Objects along with their importance. Table 3 shows the general rankings for the S1.

The results of the S1 survey indicate that those Objects usually thought of as important (e.g., Officer Efficiency Report, Unit Readiness Report) were, in fact, rated in this manner by the job incumbents. Alternately, those activities or Objects that are tangential to unit mission (e.g., Activity & Recreation Program, Social Events, Civilian Employees) were rated as being relatively less important. The ranking of several activities may not have been in the predicted direction (e.g., the low ranking of the activities surrounding the Unit Journal), but it should be remembered that this survey reflects the exact job requirements of present-day S1s. Thus, any deviations in rankings from the expected direction simply reflect an apparent change in the knowledge and skill requirements for these officers.

Table 4 shows the general ranking for the S2 officer. The results of the S2 survey indicate that those Objects having to do with current information (e.g., Situation Map, S2 Work Map) were classed as being above average importance on the job. Those Objects that are not directly related to immediate information (e.g., Counterintelligence Plan,

[1] "The Knowledge and Skills of the Battalion S1," HumRRO Division No. 4, Fort Benning, Georgia [1970]. "The Knowledge and Skills of the Battalion S2," HumRRO Division No. 4, Fort Benning, Georgia [1970]. "The Knowledge and Skills of the Battalion S3," HumRRO Division No. 4, Fort Benning, Georgia [1970]. "The Knowledge and Skills of the Battalion S4," HumRRO Division No. 4, Fort Benning, Georgia [1970].

## Battalion S1: Analysis of Object 11 and Its Related Actions

| Object | Actions |
|---|---|
| Replacements | a. Brief<br>b. determine priorities<br>c. welcome<br>d. confer w/Bn S3 re:<br>e. confer w/Bn S4 re:<br>f. confer w/Bn CO re:<br>g. confer w/Unit CO re:<br>h. confer w/Bde S1 re:<br>i. confer w/Div AG re: |

Percent Performing: 97% world-wide

If Not S1, Who Does Work: No consistent picture.

General Importance of Area: Average

General Time Requirement: Average

When Accomplished: Daily or weekly

General Difficulty Level: Below average

Comments on Specific Actions: The data indicate that for the S1 the determination of priorities for replacements is by far the most important activity in this area. In fact, the importance rating given this particular action identifies it as being one of the most important activities in the whole S1 job structure. As would be expected, this activity takes more than an average amount of time and is considered to be of more than average difficulty. It usually takes place on a daily or weekly basis, depending upon the requirements of the battalion.

Of only slightly less importance in this area are conferences with the Bn CO and Unit CO's. These conferences also take place on a daily or weekly basis.

Next in importance are welcoming and briefing of replacements, and conferences with the Bde S1 and Div. AG. Welcoming and briefing take place on a daily or weekly basis, while the conferences take place daily, weekly, or monthly, as appropriate.

Of relatively least importance in this area are conferences with the Bn S3 and Bn S4. These conferences, as far as replacements are discussed, tend to take place on an infrequent basis.

Discussion:

1. About 97% of all S1's perform some activities in connection with Replacements. This area is rated average in importance, and it is recommended that certain aspects be presented in IOAC.

This view was only partially supported by the S1's who were surveyed. Although only 7% of them reported that they had received school training in this area, about 40% thought school training should be offered in this subject.

2. Analysis of specific action has indicated that the determination of priorities for replacements is the most important activity in the area. Of slightly less importance are conferences with the Bn CO and Unit CO's. This is followed by welcoming and briefing of replacements and conferences with the Bde S1 and Div. AG. Of least importance in the area are conferences with the Bn S3 and Bn S4.

Figure 5

Table 3

## General Rating of Objects: S1

| Importance | Object Number | Object Title |
|---|---|---|
| Above Average | 35 | Officer Efficiency Report |
| | 18 | Graves Registration Service |
| | 19 | Rotation |
| | 42 | Personnel Estimate |
| | 26 | Sympathy Letter |
| | 31 | Military Justice |
| | 12 | Unit Readiness Report |
| | 9 | Casualty Feeder Report |
| | 1 | Morning Report |
| | 21 | Postal Service |
| | 43 | S1 Section SOP |
| | 25 | Congressional Actions |
| | 13 | Morale Indicator Reports |
| | 28 | State of Discipline |
| | 2 | Company Daily Strength Message |
| Average | 30 | Maintenance of Law and Order |
| | 3 | Battalion Daily Strength Message |
| | 15 | Decorations and Awards |
| | 40 | Battalion CP and Battalion HQ |
| | 39 | Awards and Ceremonies |
| | 20 | Medical Service |
| | 36 | Unit Funds |
| | 5 | Battalion Daily Status Report |
| | 32 | Personnel Procedures |
| | 10 | Administrative Reports to Higher HQ |
| | 4 | Daily Status Report (On-Line Strength Report) |
| | 29 | Disciplinary Reports |
| | 41 | S1 Workbook or S1 Notebook |
| | 11 | Replacements |
| | 22 | Rest and Recuperation |
| | 14 | Morale Indicators |
| | 44 | Tactical (Field) SOP-S1 Portion |
| Below Average | 8 | Summary Authorized/Assigned Strength |
| | 6 | Personnel Daily Summary |
| | 7 | Periodic Personnel Report |
| | 16 | Religious Services |
| | 47 | Duty Officers |
| | 48 | Duty Rosters |
| | 17 | A&R Program |
| | 23 | American Red Cross |
| | 33 | POW |
| | 27 | Army Information Program |
| | 37 | Educational Development |
| | 38 | Social Events |
| | 45 | Staff Section Journal |
| | 24 | Army Emergency Relief |
| | 34 | Civilian Employees |
| | 46 | Unit Journal |

Table 4

## General Rating of Objects: S2

| Importance | Object Number | Object Titles |
|---|---|---|
| Above Average | 12 | POW |
| | 24 | Situation Map |
| | 25 | S2 Work Map |
| | 37 | Spot Report |
| | 30 | Enemy Situation |
| | 16 | Captured Documents |
| | 1 | Classified Documents |
| | 23 | S2 Worksheet or S2 Notes |
| | 32 | Operations Orders/Plans (Intelligence Portion) |
| | 19 | Patrol Plans |
| | 35 | INTSUM |
| | 36 | INTREP |
| | 20 | Target Acquisition and Info (Potential Targets) |
| Average | 11 | Pilots/Air Observers |
| | 28 | Intelligence Estimate |
| | 21 | S2/S3 Journal |
| | 17 | Maps |
| | 34 | PERINTREP |
| | 15 | Captured Material |
| | 26 | OB Handbook |
| | 10 | Aerial Battlefield Surveillance Requests |
| | 14 | Local Civilians |
| | 9 | Aerial Reconnaissance Requests |
| | 27 | Collection Plan (EEI-OIR) |
| | 2 | Security Clearance |
| | 6 | Intelligence and Counterintelligence Training Program |
| | 7 | Scout/Reconnaissance Platoon |
| | 29 | Area of Operations |
| Below Average | 33 | Counterintelligence Plan |
| | 8 | Ground Surveillance Section |
| | 31 | Tactical (Field) SOP - S2 Portion |
| | 38 | MORTREP-SHELLREP-BOMBREP |
| | 4 | HQ Physical Security Survey |
| | 22 | Unit Journal |
| | 40 | After Action Report |
| | 3 | Security Lectures |
| | 39 | Technical Intelligence Bulletin or Summary |
| | 18 | Aerial Photographs |
| | 13 | Wind Messages |
| | 5 | Unit Censorship |

After Action Report, Technical Intelligence Bulletin) were rated as being relatively less important. Once again, these ratings were generated by job incumbents, and any deviations from the expected direction may well reflect changing job requirements.

Table 5 shows the general rankings for the S3 officer. The results of the S3 survey indicate that those aspects of the job that are operational in nature were considered most

Table 5

## General Rating of Objects: S3

| Importance | Object Number | Object Title |
|---|---|---|
| Above Average | 38 | Scheme of Maneuver |
| | 39 | Plan of Fire Support |
| | 15 | Operational Readiness Test |
| | 12 | Army Training Tests |
| | 44 | Priorities (Personnel and Equipment) |
| | 27 | Situation Map |
| | 13 | Battalion Field Exercise (FTX) |
| | 42 | Operations Orders |
| | 40 | Communications Plans |
| | 36 | Operations Estimate |
| | 20 | Battalion CP |
| | 28 | Situation Reports |
| | 48 | Air-Ground Operations |
| | 21 | Battalion Operation Center |
| | 43 | Tactical Troop Movements |
| | 41 | Troop List |
| | 14 | Command Post Exercise (CPX) |
| Average | 47 | SOI/SSI |
| | 33 | Command Report |
| | 4 | Training Calendar |
| | 26 | Unit Journal (S3 Journal/S2/S3 Journal) |
| | 45 | March Planning |
| | 25 | S3 Workbook or Notebook |
| | 34 | Unit Readiness Report |
| | 32 | Spot Reports |
| | 1 | Unit Training Programs |
| | 37 | Tactical (Field) SOP |
| | 2 | Training Schedules (Master and Weekly) |
| | 29 | After-Action Report |
| | 22 | Operations and Training Portion of Bn SOP |
| | 35 | TOE Changes |
| | 30 | Operational Report of Lessons Learned |
| | 16 | PCPT |
| | 5 | Training Facilities |
| Below Average | 23 | Policy File |
| | 31 | Periodic Reports |
| | 49 | Rear Area Security |
| | 9 | Training Schools |
| | 8 | Training Reports |
| | 3 | Bn Training Circular |
| | 10 | Army Training Programs |
| | 17 | Field Manuals |
| | 18 | AR's (Organization and Training) |
| | 46 | Administrative Marches |
| | 19 | Training Circulars |
| | 7 | Training Records |
| | 11 | Army Subject Schedules |
| | 24 | Staff Study |
| | 50 | Civil Affairs |
| | 6 | Training Aids |

important on the job. Aspects of the job that have to do with training, particularly documents and reports that deal with training, are rated as being relatively less important. This is probably valid since the written training type of documents are relatively well defined and unchanging, while operational requirements are dynamic and present the S3 with continuing new problems.

Table 6 shows the general rankings for the S4 officer. The results of the S4 survey indicate that those aspects of the job that deal with major classes of supply and major maintenance or reporting areas were rated the most important job requirements. Those job aspects that encompass minor classes of supply, or areas that occur relatively infrequently (e.g., Real Estate or Decontamination Squads) were rated as relatively less important. This particular delineation of importance would appear to be in the expected direction.

The detailed results of the School Learned vs. OJT informational areas were reported in the previously referenced separate annexes. Summarization is difficult because of the quantity, scope, and complexity of the material. In general, only a small number of staff officers reported that they had received formal school training in a particular subject. A majority indicates, however, that most subjects should be introduced in a school training situation.

This particular result has implications not only for the curriculum planner, but also for the designers of the career ladder structure, and the managers of routine assignment policy. In the latter case, it seems clear that staff officers feel that specific job-type school training should precede job assignment instead of the reverse, which is often the case in the current force structure.

Table 6

**General Rating of Objects: S4**

| Importance | Object Number | Object Title |
|---|---|---|
| Above Average | 20 | Maintenance (Vehicles and Aircraft) |
| | 43 | Movement Planning (Air and Ground) |
| | 54 | Daily Battle Loss Report |
| | 15 | Inventories |
| | 49 | Transportation (Air and Ground) |
| | 29 | Class V Supplies |
| | 6 | Hand Receipt File |
| | 24 | Unit Readiness Report |
| | 22 | Maintenance (Commo Equipment) |
| | 3 | Quarterly Report of Operational Loss |
| | 10 | Organizational Property Book |
| | 46 | Battalion Combat Trains |
| | 39 | Tactical (Field) SOP-S4 Portion |
| | 51 | Rear Area Security |
| | 33 | Class IX Supplies |
| | 48 | Bath Service |
| | 21 | Maintenance (Weapons) |
| | 37 | Logistical Estimate |
| | 38 | S4 Section SOP |
| | 47 | Battalion Feeding Plan |
| Average | 36 | Water |
| | 1 | Report of Survey |
| | 50 | Traffic Control |

*(Continued)*

Table 6 *(Continued)*

**General Rating of Objects: S4**

| Importance | Object Number | Object Title |
|---|---|---|
| Average *(Cont.)* | 12 | Prescribed Load List |
| | 5 | DA Form 2765 (2765-1 or 1150) |
| | 45 | Battalion Field Trains |
| | 40 | Administrative Order |
| | 7 | Due-In Suspense File |
| | 44 | Aerial Resupply |
| | 16 | Food Service |
| | 31 | Class VII Supplies |
| | 55 | Control & Assessment Team |
| | 52 | Captured Enemy Material |
| | 42 | Logistical Fragmentary Orders |
| | 27 | Class III Supplies |
| | 11 | Installation Property Book |
| | 41 | Administrative Plans |
| | 25 | Class I Supplies |
| | 8 | Document Register |
| Below Average | 18 | Salvage Materiel |
| | 13 | Expendable Supplies |
| | 26 | Class II Supplies |
| | 28 | Class IV Supplies |
| | 17 | Laundry-Clothing Exchange Service |
| | 2 | Statement of Charges |
| | 34 | Class X Supplies |
| | 9 | Document File |
| | 19 | Real Estate |
| | 56 | Decontamination Squads |
| | 53 | Area Damage Control Plan |
| | 14 | Individual Organizational Clothing & Equipment Record |
| | 23 | Maintenance (Medical Equipment) |
| | 57 | Rescue Squads |
| | 32 | Class VIII Supplies |
| | 30 | Class VI Supplies |
| | 4 | Cash Collection Voucher |
| | 35 | Maps |

## BATTALION COMMANDER KNOWLEDGE AND SKILLS INVENTORY

The detailed results of the battalion commander knowledge and skills research was previously issued in a research by-product.[1] This document presents detailed quantitative results for each knowledge and skill; the current view of battalion commanders on their staff, major problem areas, and leadership; and personal background information that describes the typical profile of a battalion commander.

[1] Arthur J. DeLuca and Theodore R. Powers. "Battalion Commander, Combat Arms Maneuver Battalion: Identification of Knowledge and Skills and Investigation of Thought Processing," HumRRO Division No. 4, Fort Benning, Georgia, [1971].

A summary of the results of the battalion commander survey is extremely difficult to develop, because of the large amount of complex and interacting material. For illustrative purposes, however, one particular section of the battalion commander booklet is presented and discussed, although it should be noted that this discussion covers only a small percentage of the material that was collected for this position.

Table 7 shows the results for the Leadership section of the battalion commanders booklet. The results of the Battalion Commander Leadership survey are remarkable in several respects. First, almost all subjects reported that each of the 77 Leadership Objects are included as a part-of-the-position. Second, the average percentage range of part-of-the-position is rather low overall, and, in fact, only covers a ratio of about two to one in the entire list. Both of these findings would seem to signify that the Leadership area, in general, is considered a job requirement for all commanders and that various subtopics in the area are not thought of as having a great deal of differentiation.

An important observation is that 13 of the 22 Objects appearing in the upper third of the ranking worldwide also appeared in that category in the Vietnam results. (The common 13 are identified by asterisks (*) by the numbers in the Rank column.) An inference that may be drawn from this finding is that the leadership requirements at battalion level are, to a major extent, quite similar, whether the battalion is in a combat or a garrison situation.

Another observation is that "Setting and maintaining standards" and "Setting the example" were chosen one and two in the rankings of all commanders everywhere. Commanders clearly believe that a most important part of leadership is the role of a "model" that should be played by the commander.

The battalion commander knowledge and skills inventory, one of the five separate annexes to this report, presents detailed data for the areas of *Personnel*, *Intelligence*, *Operations*, *Logistics*, *Training*, *Management*, *Decision-Making*, and *Leadership*. A detailed discussion of the results for each of these areas is presented in the annex with comparisons and comments, of the data from Vietnam to the worldwide results.

Table 7

## Battalion Commander Leadership— Ranking of Objects: Worldwide

NOTE: The following definition of Leadership was used in this research:

"Leadership is the process of influencing the actions of individuals and organizations in order to obtain desired results." (Department of the Army Pamphlet 600-15)

| Rank[a] | Object | Average Percent "Part-of-the-Position" | | | Percent of Subjects Responding |
|---|---|---|---|---|---|
| | | Cumulative Sum by All Subjects | On Item, by All Subjects | On Item, by Subjects Responding | |
| *1 | Setting and maintaining standards | 1.7 | 1.7 | 1.7 | 98.8 |
| *2 | Setting the example | 3.4 | 1.7 | 1.7 | 98.8 |
| *3 | Enlisted men's safety and welfare | 5.0 | 1.6 | 1.6 | 98.8 |
| *4 | Organizing | 6.6 | 1.6 | 1.6 | 97.6 |
| *5 | Setting goals/levels of achievement or effort | 8.2 | 1.6 | 1.6 | 98.8 |

*(Continued)*

Table 7 *(Continued)*

## Battalion Commander Leadership— Ranking of Objects: Worldwide

| Rank[a] | Object | Average Percent "Part-of-the-Position" | | | Percent of Subjects Responding |
|---|---|---|---|---|---|
| | | Cumulative Sum by All Subjects | On Item, by All Subjects | On Item, by Subjects Responding | |
| *6 | Giving clear, positive, and timely orders | 9.8 | 1.6 | 1.6 | 98.8 |
| *7 | Establishing and maintaining *esprit de corps* | 11.4 | 1.6 | 1.6 | 98.8 |
| *8 | Rewarding/praising subordinates | 12.9 | 1.5 | 1.5 | 98.8 |
| 9 | Initiating actions | 14.4 | 1.5 | 1.5 | 98.8 |
| 10 | Motivating | 15.9 | 1.5 | 1.5 | 98.8 |
| 11 | Inspecting | 17.4 | 1.5 | 1.5 | 98.8 |
| 12 | Planning | 18.9 | 1.5 | 1.5 | 98.8 |
| 13 | Directing | 20.4 | 1.5 | 1.5 | 98.8 |
| *14 | Keeping subordinates informed | 21.9 | 1.5 | 1.5 | 98.8 |
| *15 | Fostering individual and unit confidence | 23.4 | 1.5 | 1.5 | 95.2 |
| *16 | Personal visits | 24.9 | 1.5 | 1.6 | 98.8 |
| *17 | Consistency in disciplinary matters | 26.4 | 1.5 | 1.6 | 96.4 |
| 18 | Accessibility to officers | 27.8 | 1.4 | 1.4 | 97.6 |
| 19 | Accessibility to enlisted men | 29.2 | 1.4 | 1.4 | 97.6 |
| 20 | Acts expressing approval | 30.6 | 1.4 | 1.4 | 97.6 |
| *21 | Controlling | 32.0 | 1.4 | 1.4 | 97.6 |
| 22 | Evaluating | 33.4 | 1.4 | 1.4 | 98.8 |
| 23 | Making policy | 34.8 | 1.4 | 1.5 | 98.8 |
| 24 | Allowing subordinates to develop procedures and techniques to implement policies | 36.2 | 1.4 | 1.4 | 98.8 |
| 25 | Creating an atmosphere which fosters mutual confidence and respect | 37.6 | 1.4 | 1.5 | 98.8 |
| 26 | Fostering the expression of new ideas, frank appraisals, and honest convictions through personal encouragement | 39.0 | 1.4 | 1.4 | 98.8 |
| 27 | Giving staff every opportunity to participate in the development of plans, policies, and procedures | 40.4 | 1.4 | 1.4 | 98.8 |
| 28 | Disseminating information on plans and operations as completely as security requirements permit | 41.8 | 1.4 | 1.4 | 98.8 |
| 29 | Finding out and attempting to eliminate the basic conditions creating uncertainty and frustrations before they accumulate | 43.2 | 1.4 | 1.4 | 97.6 |
| 30 | Assuring men know what is expected of them | 44.6 | 1.4 | 1.5 | 97.6 |
| 31 | Expressing confidence in the unit's combat ability | 46.0 | 1.4 | 1.5 | 95.2 |
| 32 | Providing a sense of accomplishment | 47.4 | 1.4 | 1.5 | 97.6 |
| 33 | High energy | 48.8 | 1.4 | 1.5 | 95.2 |
| 34 | Mission type orders | 50.2 | 1.4 | 1.5 | 94.0 |
| 35 | Informal relationship with officers | 51.5 | 1.3 | 1.3 | 98.8 |
| 36 | Courage | 52.8 | 1.3 | 1.3 | 97.6 |

*(Continued)*

Table 7 *(Continued)*

## Battalion Commander Leadership—Ranking of Objects: Worldwide

| Rank[a] | Object | Average Percent "Part-of-the-Position" | | | Percent of Subjects Responding |
|---|---|---|---|---|---|
| | | Cumulative Sum by All Subjects | On Item, by All Subjects | On Item, by Subjects Responding | |
| 37 | Serving as spokesman for the unit | 54.1 | 1.3 | 1.3 | 97.6 |
| 38 | Performing as counselor | 55.4 | 1.3 | 1.3 | 97.6 |
| 39 | Teaching | 56.7 | 1.3 | 1.3 | 98.8 |
| 40 | Delegating authority | 58.0 | 1.3 | 1.4 | 98.8 |
| 41 | Enforcing policies/regulations | 59.3 | 1.3 | 1.3 | 97.6 |
| 42 | Considering staff recommendations fully and objectively before making final decision | 60.6 | 1.3 | 1.4 | 97.6 |
| 43 | Developing confidence in individuals toward their leaders | 61.9 | 1.3 | 1.3 | 98.8 |
| 44 | Aesthetic and moral commitment to work | 63.2 | 1.3 | 1.4 | 94.0 |
| 45 | Originating new ideas or practices | 64.5 | 1.3 | 1.3 | 98.8 |
| 46 | Formal relationship with officers | 65.7 | 1.2 | 1.2 | 98.8 |
| 47 | Formal relationship with enlisted men | 66.9 | 1.2 | 1.2 | 97.6 |
| 48 | Officer's safety and welfare | 68.1 | 1.2 | 1.2 | 98.8 |
| 49 | Enlisted men's personal matters | 69.3 | 1.2 | 1.2 | 97.6 |
| 50 | Soliciting opinions of subordinates | 70.5 | 1.2 | 1.2 | 98.8 |
| 51 | Giving opinions to subordinates | 71.7 | 1.2 | 1.3 | 98.8 |
| 52 | Suggesting ways to accomplish tasks | 72.9 | 1.2 | 1.2 | 98.8 |
| 53 | Explaining the WHY of orders, etc. | 74.1 | 1.2 | 1.2 | 97.6 |
| 54 | Warning/reprimanding subordinates | 75.3 | 1.2 | 1.2 | 98.8 |
| 55 | Sense of humor | 76.5 | 1.2 | 1.2 | 98.8 |
| 56 | Praising members for effort or achievement | 77.7 | 1.2 | 1.2 | 97.6 |
| 57 | Coordinating | 78.9 | 1.2 | 1.2 | 98.8 |
| 58 | Informing men what means they have at their disposal to assist them in accomplishing the mission | 80.1 | 1.2 | 1.3 | 95.2 |
| 59 | Instilling in the men an aggressive attitude and desire to destroy the enemy | 81.3 | 1.2 | 1.4 | 86.9 |
| 60 | Great work output | 82.5 | 1.2 | 1.3 | 92.9 |
| 61 | Persuading | 83.6 | 1.1 | 1.1 | 97.6 |
| 62 | Welcoming | 84.7 | 1.1 | 1.1 | 98.8 |
| 63 | Interviewing | 85.8 | 1.1 | 1.1 | 98.8 |
| 64 | Keeping informed of current rumors in the unit | 86.9 | 1.1 | 1.1 | 95.2 |
| 65 | Strength | 88.0 | 1.1 | 1.2 | 88.1 |
| 66 | Informal relationship with enlisted men | 89.0 | 1.0 | 1.0 | 98.8 |
| 67 | Encouraging pleasant group atmosphere | 90.0 | 1.0 | 1.0 | 96.4 |
| 68 | Briefing | 91.0 | 1.0 | 1.0 | 98.8 |
| 69 | Determining when/how work will be evaluated | 92.0 | 1.0 | 1.0 | 94.0 |
| 70 | Knowing enemy's capabilities | 93.0 | 1.0 | 1.3 | 81.0 |

*(Continued)*

Table 7 *(Continued)*

**Battalion Commander Leadership—Ranking of Objects: Worldwide**

| Rank[a] | Object | Average Percent "Part-of-the-Position" | | | Percent of Subjects Responding |
|---|---|---|---|---|---|
| | | Cumulative Sum by All Subjects | On Item, by All Subjects | On Item, by Subjects Responding | |
| 71 | Officer's personal matters | 93.9 | .9 | .9 | 98.8 |
| 72 | Acts expressing disapproval | 94.8 | .9 | 1.0 | 95.2 |
| 73 | Esteem by others | 95.7 | .9 | 1.0 | 91.7 |
| 74 | Handling of attached/supporting units | 96.6 | .9 | 1.0 | 91.7 |
| 75 | Reducing conflicts between members | 97.5 | .9 | 1.0 | 96.4 |
| 76 | Serving as mediator | 98.3 | .8 | .8 | 98.8 |
| 77 | Determining differences of opinion between subcommanders and staff | 99.1 | .8 | .9 | 98.8 |

[a]Asterisks denote objects that appear in the upper one-third of the ranking worldwide and Vietnam categories.

## THOUGHT PROCESSING OF THE BATTALION COMMANDER AND HIS STAFF

The detailed results of the thought processing of the battalion commander and his staff are also presented in the previously referenced battalion commander inventory. For illustrative purposes a few observations are recorded here.

It should be remembered that these results are based upon data collected from a simulated battalion CPX. Experienced Army officers have judged this simulation to be a realistic representation of real world situations. However, it is possible that the environment of the simulation may have created artifacts in the findings; thus, the data obtained in the area of thought processing are subject to experimental verification.

The initial phase of the analysis involved determining the frequencies of the two sources of requirements—the Command Imposed and Situation Created categories. (Command Imposed indicates that an element of communication has been passed to the battalion level from some level higher in the chain of command, while Situation Created refers to an element of communication that is passed to battalion level from somewhere lower in the chain of command.) In general, the Command Imposed category occurred more often. However, there was some variability in these frequencies in reference to staff positions, and these differences are shown in Table 8.

The data seem to indicate that direct communication with the Battalion Commander tends to occur more from brigade level than from lower levels, while more company level communication is directed at the staff—particularly the S3, who receives more situation-created communication than any other staff officer.

At this point in the thought processing sequence (Figure 4), the communications—from whatever source--combine to feed into the battalion staff. This input creates various requirements on the commander and staff. The frequency of the resulting behavior patterns is described next.

The first significant pattern is that of Storing (Table 9). The results clearly illustrate that the amount of storing is a function of staff position. Those jobs (S2, S3) that tend to receive the largest amounts of information tend to have the most information stored. This is shown particularly well in the S2 position in which the primary job requirement is the collection, integration, and dissemination of information. The relatively low level of storing for the battalion commander probably indicates that Storing type information is usually passed directly to one of the staff officers rather than to the commander.

Table 8

**Frequencies of Communication Initiation to Each Staff Position**

| Staff Position | Situation Created (%) | Command Imposed (%) |
|---|---|---|
| Battalion Commander | 23 | 77 |
| S1 | 33 | 67 |
| S2 | 36 | 64 |
| S3 | 46 | 54 |
| S4 | 39 | 61 |

Table 9

**Storing Type of Responses for Each Staff Position**

| Staff Position | Amount of Storing Type of Responses per Staff Position (%) |
|---|---|
| Battalion Commander | 12 |
| S1 | 2 |
| S2 | 47 |
| S3 | 37 |
| S4 | 2 |

The other two categories of behavior patterns are interactive in nature. Figure 6 shows and contrasts the Analytical and Automatic type responses for each officer and each phase[1] of the simulation.

The results indicate that, in general, the Automatic response occurs most frequently for the battalion staff. However, the commander consistently exhibits the Analytical type of responses during all phases of the CPX. This finding would probably be expected as the commander has the responsibility for making final decisions. To do this, he must search through a wide range of alternatives, evaluate the data presented, and select the most appropriate course of action in each case. The data indicate that these decisions require unique solutions to the problems presented; thus, analytical response patterns are often required. However, the fact that not all the commander's decisions are required to be analytical in nature would tend to indicate that some of the solutions to problems can be preplanned; thus, some stability can be programmed into the response pattern.

The data involving the S1 presents an interesting picture. Although at times this job has been viewed as being rather routine in nature, Figure 6 indicates that there is more complexity in the job than was previously supposed. There is a slight tendency for the response pattern of the S1 to switch from a majority of Automatic responses to a majority of Analytical responses as the intensity of the CPX is increased, but the magnitude of this switch is small and is probably of no practical importance. What is of

[1] The FORGE simulation was divided into three phases (shown as I, II, and III in Figure 6). In the first, the battalion was engaged in routine company level patrolling; in the second, the warning order was issued for an airmobile assault; in the final phase, the airmobile assault was made, and the battalion was engaged in extensive tactical operations. It was intended that each successive phase would apply more and more pressure to the player personnel by decreasing the amount of administrative routine and increasing the amount of tactical requirements.

## Individual Response Patterns of Battalion Commander and Staff

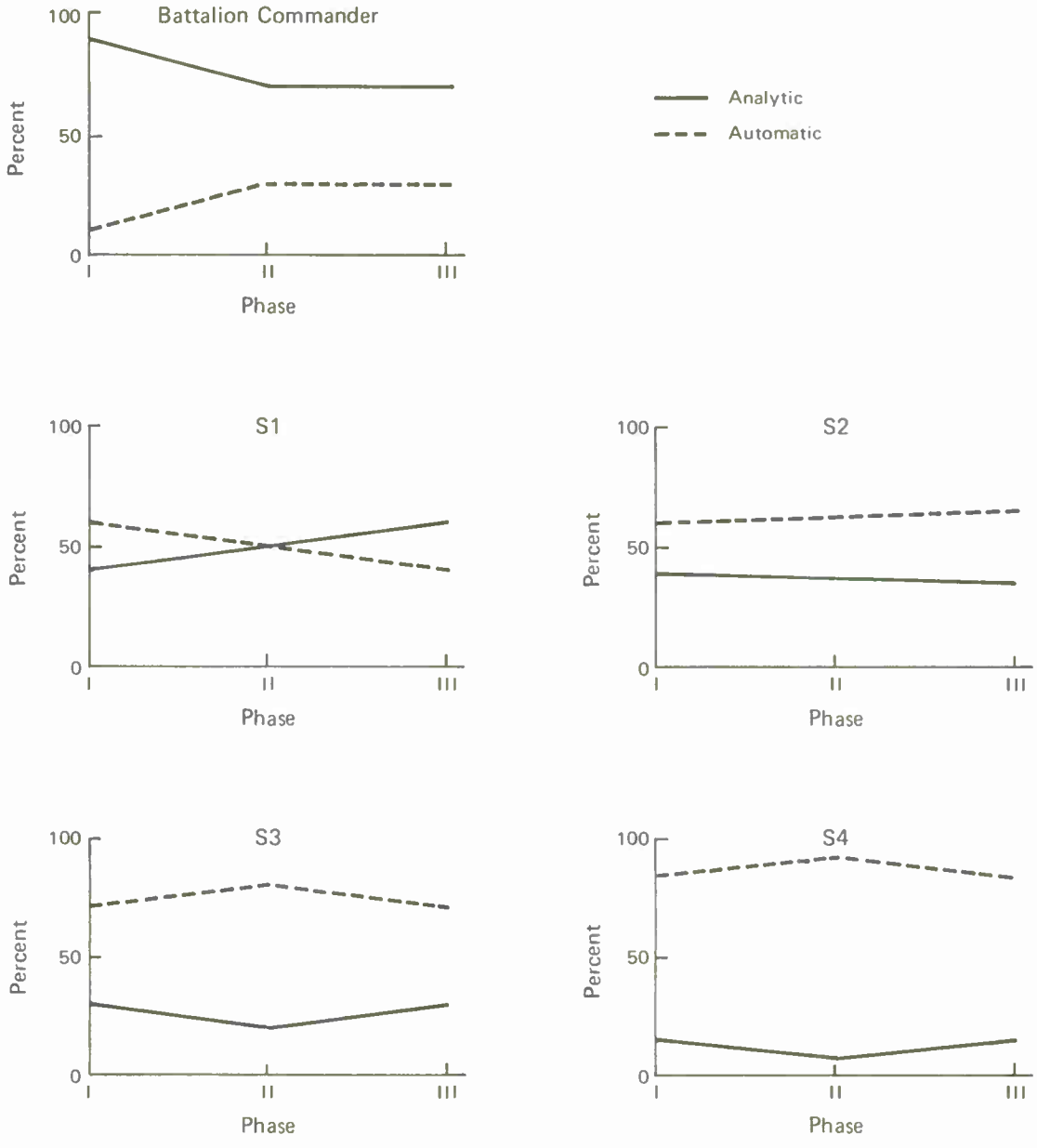


Figure 6

interest is the fact that during the whole simulation, approximately one-half the S1 responses are Analytical in nature. This rather high proportion of Analytical responses for this staff officer means that officers occupying the position should be prepared to assume a job in which more creativity is required than might have been expected.

The data on the activities of the S2 are also worthy of special comment. The S2 often has been shown as the recipient of large amounts of fragmented information that purportedly is assessed to make meaningful patterns. The data show that, in fact, a majority of the time, the S2 is making Automatic Responses. This may imply that the procedures for collecting and evaluating intelligence information are of such specificity

that the typical mode of responding is largely predetermined. The picture that is presented to the commander by the S2 may be unique in regard to the factors assessed, but the thought processing that is involved in obtaining that picture apparently follows a fairly well laid out course.

Data for the S3 are probably predictable. As seen in all phases of the simulation, the Automatic response occurs a majority of the time. Since this staff officer is primarily responsible for carrying out the wishes of the commander as regards tactical matters, it would probably be expected that prescribed modes of responding would be in the majority. It is interesting to note that during Phase II (the planning phase of the CPX), there is actually an increase in the amount of Automatic responses. This finding may underlie the existence of exact administrative procedures that are involved in the planning of a tactical operation.

The data describing the actions of the S4 present a rather clear-cut picture. Here, in all situations, a great majority of S4 responses are automatic in nature. The explanation probably lies in the well-established administrative procedures of the logistics and supply system. Most requirements that are placed on the S4 apparently require no analysis, per se, but simply require that the input energize some previously established sequence of events that will meet the needs of the requesting agency. This finding should not be interpreted to mean that S4 personnel are less creative in their work than are other staff officers. The finding simply identifies a general area that is extensively organized with specific procedures that can be used by the S4 to solve most of his requirements.

In summary, it can be said that while the battalion commander typically engages in responses that can be labeled as Analytical in nature, the responses of the staff are, in the majority of cases, Automatic reactions to the imposed requirements. This finding is probably in the expected direction. One would possibly assume that since it is the commander who is ultimately responsible for the actions of his battalion, he would be expected to make the majority of Analytical responses. Alternately, since it is the job of the staff to carry out the wishes of the commander, it might be assumed that the typical mode of responding for this group would be in the direction of using predetermined patterns of behavior. This use of predetermined patterns emphasizes that, for the battalion staff, "thought processing" is a more descriptive concept than the term "thinking."

## CONCLUSIONS

The results of this research are currently being used by the USAIS to improve their courses of instruction as outlined in their own Master Plan and as prescribed by administrative documents from higher headquarters (1, 2). The implementation of the knowledge and skills data has been relatively easy to accomplish, because information of this type can be used directly in the systems engineering process. The direct use of the thought processing information has been more difficult because of the basically nebulous nature of the subject matter, and it is in this area that further research could be accomplished. This is particularly applicable for command decision-making, where relatively little exact information has been identified, and interest in developing data of this type is increasing.

The use of three separate scales to determine knowledge and skill requirements of the battalion staff worked out well. Later, the use of the Hemphill part-of-the-position single scale, representing a combination of importance, criticality, and time spent, was equally well received by battalion commanders.

For the staff officer, it was again determined that the task of identifying the job requirements of line workers is a straightforward operation. Investigating these same

requirements for the executive job is much more difficult, and, possibly for the first time, quantitative data has been gathered on the complex and difficult job of the battalion commander. An observation that can be made about this job is that each commander typically views his role as being unique. This research concludes that uniqueness rests with the individual and not with the job. There is now sufficient evidence to describe adequately and accurately the knowledge and skills of the battalion commander and his principal staff officers, wherever they may be stationed throughout the world.

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## LITERATURE CITED


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1 PLNS OFCR PSYCH HDQTRES USAPDCEC FT ORD
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1 COMDT USA CA SCH ATTN DOI FT BRAGG
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1 COMDT USA SCH & TNG CTR ATTN ACOFS G3 PLNS & OPS DIV FT MCCLELLAN
10 COMDT USA INST FOR MIL ASSIST ATTN DOI FT BRAGG
1 LIBN USAIS FT BENNING
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2 CG ARMY MED R+D COMD ATTN BEHAV SCI RES BR
1 US ARMY BEHAVIOR & SYS RSCH LAB ATTNCRD-AR ARL VA
1 OPD PERS MGT DEV OFC ATTN MDS SEC (NEW EQUIP) OPOMD
1 PROVOST MARSHAL GEN DA
1 OFC RESERVE COMPON DA
2 CG USA SEC AGCY ARL HALL STA ATTN AC OF S G1 VA
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1 CO US ARMY MED RES LAB FT KNOX
1 CHF OF R+D DA ATTN CHF TECH + INDSTR LIAISON OFC
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1 USA LIB DIV-TAGD ATTN ASDIRS
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1 PRES ARMY INF BD FT BENNING ATTN FE+SP DIV
1 PRES ARMY MAINT BD FT KNOX
2 PRES ARMY ARTY BD FT SILL
1 CG CONARC ATTN COL E M HUDAK ATIT-SA FT MONROE
15 CG CONARC ATTN ATIT-STM FT MONROE
2 CG CONARC ATTN LIB FT MONROE
1 CO ARMY CBT DEVEL COMD MILIT POLICE AGY FT GORDON
1 USA ARCTIC TEST CTR CHF INSTR & TEST METH DIV SEATTLE
1 CHF USA AD HRU FT BLISS
1 CHF USA ARMOR HRU FT KNOX
1 CHF USA AVN HRU FT RUCKER
1 CHF USA INF HRU FT BENNING
1 CHF USA TNG CTR HRU PRES OF MONTEREY
10 CG 4TH ARMORED DIV ATTN DCSOT APO NY 09325
2 CO 194TH ARMORED BDE FT KNOX
5 CO 2D ARMORED CAV REGT APO 09693 NY
1 CO 3D ARMORED CAV REGT FT LEWIS
4 CO 14TH ARMORED CAV REGT ATTN AVN OFCR APO 09146 NY
1 1ST ARMORED DIV HQ & HQ CO FT HOOD ATTN AC OF S G2
5 CO 1ST BN 63RD ARMOR 1ST INF DIV ATTN S3 FT RILEY
8 CO 1ST BN 64TH ARMOR 3RD INF DIV ATTN S3 APO NY 09031
5 CO 2ND BN 68TH ARMOR 8TH INF DIV ATTN S3 APO NY 09034
1 CO COMPANY A 3D BN 32D ARMOR 3D ARMORED DIV APO NY
1 CO 5TH BN 33D ARMOR ATTN S3 FT KNOX
1 CO 3RD BN 68TH ARMOR 8TH INF DIV ATTN S3 APO NY 09028
1 CO 3RD BN 37TH ARMOR 4TH ARMORED DIV ATTN S3 APO NY 09046
1 CALIF NG 40TH ARMORED DIV LOS ANGELES ATTN AC OF S G3
1 55TH COMD HQ DIV ARMY NG JACKSONVILLE FLA
1 CG HQ 27TH ARMORED DIV NY AIR NG SYRACUSE
1 TEXAS NG 49TH ARMORED DIV DALLAS
3 CG ARMY ARMOR CTR FT KNOX ATTN G3 AIRKGT
1 CG 3RD INF DIV ATTN ACOFS G3 APO NY 09036
1 CG 7TH INF DIV ATT ACOFS G2 APO SAN FRAN 96207
1 CG 9TH INF DIV ATTN ACOFS G2 APO NY 09111
3 CG 4TH INF DIV (MECH) & FT CARSON ATTN ACOFS G3
1 DA HQS FT CARSON & HQS 4TH INF DIV (MECH) ATT MAJ HARRIS
3 CG 82ND ABN INF DIV ATTN ACOFS G3 FT BRAGG
1 CG XVIII ABN CORPS ATTN ACOFS G3 FT BRAGG
1 CO 197TH INF BRGD FT BENNING ATTN S3
1 CO 1ST BN (REINF) ATTN S3 FT MYER
1 CO HDQTRS 2ND BN 6TH US INF REGT AITN S3 APO NY 09742
7 CO 3RD BN 6TH INF REGT ATTN S3 APO NY 09742
1 CO 171ST INF BDE ATTN S3 APO SEATTLE 98731
1 CO 1ST BN 39TH INF 8TH INF DIV ATTN S3 APO NY 09034
1 CO 2ND BN 15TH INF 3RD INF DIV ATTN S3 APO NY 09026
5 CG 1ST INF DIV ATTN ACOFS G3 FT RILEY
5 CO 1ST BN (MECH) 52ND INF 198TH INF BDE ATTN S3 APO SAN FRAN 96219
1 CO 4TH BN (MECH) 54TH INF ATTN S3 FT KNOX
1 CO USA PARTIC GP USA TNG DEVICE CTR FLA
2 DA OFC OF ASST CHF OF STAFF FOR COMM-ELCT ATTN CETS-6 WASH
1 CHF MED PERS PROJ ARMY HOSP US MILIT ACAD WEST POINT
1 CG MILIT DIST OF WASHINGTON
2 DA USA ADV GP (ARNGUS) RALEIGH NC

1 USA RECRUITING COHO HAMPTON VA
1 SYS RES GP ENGNR EXPRM STA COLUMBUS O
1 OIR ARMY LIB PENTAGON
1 CHF OF HILIT HIST OA ATTN GEN REF BR
1 CO USA 10TH SPEC FORCES GP FT OEVENS
1 CO 24TH ARTY GP (AD) ATTN S3 RI
1 CG 31ST ARTY BOE AO ATTN S3 PA
1 CO 49TH ARTY GP AO ATTN S3 FT LAWTON
2 HQS 4TH BN 59TH ARTY REGT ATTN S3 NORFOLK
1 CO 28TH ARTY GP AO ATTN S3 SELFRIDGE AFB
1 HQS 45TH ARTY BOE AO ATTN S3 ARL HTS ILL
1 CO 35TH ARTY BOE AO ATTN S3 FT HEADE MO
1 CG 101ST ABN DIV (AIRMOBILE) ATTN ACOFS G3 APO SAN FRAN 96383
1 CG 1ST CAV (AIRMOBILE) ATTN ACOFS G3 APO SAN FRAN 96383
1 US ARMY GEN EQUIP ATTN TECH LIB FT LEE
1 US ARMY TROPIC TEST CTR PO DRAWER 942 ATTN BEHAV SCIEN CZ
1 CO USAFAAC ATTN S3 FT SILL
10 CG III CORPS & FT HOOO ATTN G3 SEC FT HOOO
30 CO 1ST ARMORED DIV ATTN G3 SEC FT HOOO
30 CG 2D ARMORED DIV ATTN G3 SEC FT HOOO
25 CO 13TH SUPT BGDE ATTN S3 SEC FT HOOO
1 CG USAFAC & FT SILL ATTN AKPSIGT-TNTN
20 CO III CORPS ARTY ATTN G3 SEC FT SILL
15 CO 1ST AIT BGOE ATTN G3 SEC FT BLISS
8 CG USATCI & FT POLK ATTN AKPPO-OCOT
1 RSCH CONTRACTS & GRANTS BR ARO
1 BESO ARO OFC CHF OF R&O WASH DC
1 CHF OF R&O OA ATTN SCI INFO BR RSCH SPT DIV WASH DC
1 CO HQS BN USAFAC & FT SILL ATTN S3
4 CO III CORPS ARTY ATTN S3 FORT SILL
1 CO USRAH ATTN S3 FT SILL
1 CG USAFACFS ATTN AKPSIAG-AS FT SILL
1 EACH PROF OF MILITARY SCI USA ROTC
1 CINC US ATLANTIC FLT CODE 312A USN BASE NORFOLK
1 CINC PACIFIC SCIEN AOV GP 1J30SI BOX 13 FPO 9661D
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2 CO US FLT TNG CTR NORFOLK
1 CO FLEET TNG CTR US NAV STA SAN OIEGO
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1 PRES NAV WAR COLL NEWPORT ATTN MAHAN LIB
2 CO & OIR US ATLANTIC FLT ASW TACTICAL NORFOLK
2 CO FLT SONAR SCH KEY WEST
1 CO FLT ANTI-SUB WARFARE SCH SAN OIEGO
1 CHF OF NAVL RSCH PERS & TNG BR (CODE 458) ARL VA
1 CHF OF NAV RES ATTN HEAO GP PSYCHOL BR CODE 452
1 DIR US NAV RES LAB ATTN CODE 5120
1 OIR NAVAL RSCH LAB ATTN LIB CODE 2029 WASH DC
1 CHF OF NAV AIR TNG TNG RES OEPT NAV AIR STA PENSACOLA
1 CO HED FLO RES LAB CAMP LEJEUNE
1 COR NAV HSL CTR POINT HUGU CALIF ATTN TECH LIB CODE 3022
1 OIR AEROSPACE CREW EQUIP LAB NAV AIR ENGNR CTR PA
2 OIC NAV PERS RES ACTVY SAN OIEGO
1 NAV NEUROPSYCHIAT RES UNIT SAN OIEGO
1 OIR PERS RES LAB NAV PERS PROGRAM SUPPORT ACTIVITY WASH NAV YO
1 NAV TNG PERS CTR NAV STA NAV YO ANNEX CODE 83 ATTN LIB WASH
3 COMDT MARINE CORPS HQ MARINE CORPS ATTN CODE AO-1B
1 HQ MARINE CORPS ATTN AX
1 OIR MARINE CORPS EDUC CTR MARINE CORPS SCH QUANTICO
1 OIR MARINE CORPS INST ATTN EVAL UNIT
1 US MARINE CORPS HQS HIST REF LIB ATTN MRS JADDT
1 CHF OF NAV OPNS OP-OIP1
1 CHF OF NAV OPNS OP-07TL
2 COMOT HQS 8TH NAV OIST ATTN EDUC AOV NEW ORLEANS
1 CHF OF NAV AIR TECH TNG NAV AIR STA MEMPHIS
1 DIR OPS EVAL GRP OFF OF CHF OF NAV OPS OPO3EG
2 COMOT PTP COAST GUARO HO
1 CHF OFCR PERS RES + REVIEW BR COAST GUARD HQ
1 CO US COAST GUARO TNG CTR GOVERNORS ISLAND NY
1 CO US COAST GUARO TNG CTR CAPE MAY NJ
1 CO US COAST GUARO TNG CTR & SUP CTR ALAMEDA CALIF
1 CO US COAST GUARO INST OKLA CITY OKLA
1 CO US COAST GUARO RES TNG CTR YORKTOWN VA
1 SUPT US COAST GUARO ACAO NEW LONOON CONN
1 AIR TNG COMO/XPT RANOOLPH AFB
1 TECH OIR TECH TNG OIV(HROI AFHRL LOWRY AFB COLO
1 CHF SCI OIV ORCTE SCI + TECH OCS R+O HQ AIR FORCE AFRSTA
1 FAA ORCTE OF PLNS & OPS HQ USAF WASH DC
1 CHF OF PERS RES BR ORCTE OF CIVILIAN PERS OCS-PERS HQ AIR FORCE
1 CHF ANAL DIV (AFPOPL (RI OIR OF PERSONNEL PLANNING HQS USAF
2 COR ELEC SYS OIV LG HANSCOM FLO ATTN ESHOA/STOP 36 HASS
1 AFHRL/TT ATTN CAPT W S SELLMAN LOWRY AFB
1 HQ SAHSO (SMSIRI AF UNIT POST OFC LA AFS CALIF
2 HILIT TNG CTR OPE LACKLANO AFB
2 AFHRL IHRTI WRIGHT-PATTERSON AFB
1 AMO AMRH BROOKS AFB TEXAS
1 HQS ATC OCS/TECH TNG (ATTMS) RANOOLPH AFB
1 USAFA OIR OF THE LIB USAF ACAO COLO
1 6570TH PERS RES LAB PRA-4 AEROSPACE MEO OIV LACKLANO AFB
2 CO HUMAN RESOURCES LAB BROOKS AFB
1 COMOT USAF SPEC OP SCH (TAC) EGLIN AFB
1 AFHRL (FT) WILLIAMS AFB ARIZ
1 PSYCHOBIOLOGY PROG NATL SCI FOUND
1 DIR NATL SECUR AGY FT GEO G MEAOE ATTN TOL
1 OIR NATL SECUR AGY FT GEO G MEAOE ATTN DIR OF TNG
3 CIA ATTN CRS/AOO STANDARD OIST
1 SYS EVAL OIV RES OIRECTORATE ODO-DCO PENTAGON
1 DEPT OF STATE BUR OF INTEL + RES EXTERNAL RES STAFF
1 SCI INFO EXCH WASHINGTON
2 CHF MGT & GEN TNG DIV TR 2DO FAA WASH DC
1 BUR OF RES & ENGR US POST OFC OEPT ATTN CHF HUMAN FACTORS BR
1 EDUC MEDIA BR OE HEW ATTN T O CLEMENS
1 NAT'L BUR STANDS BEHAV SCI GP ATTN OR O E ERLICK
1 OFC OF INTERNATL TNG PLANNING & EVAL BR AID WASH DC
1 OEPT OF TRANS FAA ACQ SEC HQ 610A WASH OC
2 ERIC OE WASH OC
1 SYS OEVEL CORP SANTA MONICA ATTN LIB
2 OUNLAP + ASSOC INC OARIEN ATTN LIB
2 RAC ATTN LIB MCLEAN VA
1 RAND CORP WASHINGTON ATTN LIB
1 GP EFFECTIVENESS RSCH LAB U OF ILL OEPT OF PSYCHOL
1 ELECT PERS RSCH GP U OF SOUTHERN CALIF
1 COLUMBIA U ELEC RES LABS ATTN TECH EOITOR
1 MITRE CORP BEOFORO MASS ATTN LIB
2 LEARNING R&O CTR U OF PITTS ATTN OIR
1 WESTERN ELECTRIC CO INC NY
1 HUMAN SCI RES INC MCLEAN VA
2 TECH INFO CTR ENGNR OATA SERV N AMER AVN INC COLUMBUS O
1 CHRYSLER CORP MSL OIV OETROIT ATTN TECH INFO CTR
1 RAYTHEON SERV CO ATTN LIBN BURLINGTON MASS
1 GEN OYNAMICS POMONA OIV ATTN LIB OIV CALIF
2 OTIS ELEVATOR CO OIV ATTN LIB STAMFORO CONN
1 MGR BIOTECHNOLOGY AEROSPACE SYS OIV MS BH-25 BOEING CO SEATTLE
1 IOA RSCH & ENG SUPT OIV ARL VA
1 SCI & TECH OIV IOA ARL VA
1 HUGHES AIRCRAFT COMPANY CULVER CITY CALIF
1 OIR CTR FOR RES ON LEARNING + TEACHING U OF MICH
1 R M STOGOILL OHIO STATE UNIV
1 EOITOR TNG RES ABSTR AMER SOC OF TNG OIRS U OF TENN
1 U OF CHICAGO OEPT OF SOC
1 OIR CTR FOR RSCH IN SOCIAL SYS KENSINGTON MO
3 CANADIAN JOINT STAFF OFC OF OEF RES MEMBER WASHINGTON
3 CANADIAN ARMY STAFF WASHINGTON ATTN GSO2 TNG
2 CANADIAN LIAISON OFCR ARMY ARMOR BO FT KNOX
2 OFC OF ARMED FORCES ATTACHE ROYAL SWEOISH EMBSY OC
3 AUSTRALIAN NAV ATTACHE EMBSY OF AUSTRALIA WASH OC
1 OFC OF AIR ATTACHE AUSTRALIAN EMBSY ATTN: T.A. NAVGN WASH, O.C.
2 AUSTRALIAN ARMY ATTACHE EMBSY OF AUSTRALIA ATTN TECH CLK
1 OR B T OOOO LRNING SYS LTO SURREY ENGLAND
1 MENNINGER FOUNOATION TOPEKA
1 AMER INSTS FOR RSCH SILVER SPRING
1 AMER INSTS FOR RSCH ATTN LIBN PA
1 OIR PRIMATE LAB UNIV OF WIS MAOISON
1 OR E GINZBERG COLUMBIA UNIV SCH OF BUS
3 MATRIX RSCH CO FALLS CHURCH VA
1 EOUC & TNG CONSLT CO LA CALIF
1 OR GEORGE T HAUTY CHMN OEPT OF PSYCHOL U OF OEL
1 GEN ELECTRIC CO SANTA BARBARA ATTN LIB
1 VITRO LABS SILVER SPRING MO ATTN LIBN
1 HEAO OEPT OF PSYCHOL UNIV OF SC COLUMBIA
1 TVA PERS STAFF OFCR KNOXVILLE TENN
1 U OF GEORGIA OEPT OF PSYCHOL
1 U OF UTAH OEPT OF PSYCHOL
1 GE CO WASH O C
1 AMER INST FOR RSCH ATTN LIB PALO ALTO CALIF
1 COLL OF ARTS & SCI U OF MIAMI ATTN L L MCQUITTY
1 ROWLANO + CO HAOOONFIELO NJ ATTN PRES
1 NORTRONICS OIV OF NORTHROP CORP ANAHEIM CALIF
1 OHIO STATE U SCH OF AVN
2 AIRCRAFT ARMAMENTS INC COCKEYSVILLE MO
1 OR J B CULLEN OEPT OF SOC & ANTHROP UNIV OF RI
2 OREGON STATE U OEPT OF MILIT SCI ATTN AOJ
1 AMER PSYCHOL ASSOC WASHINGTON ATTN PSYCHOL ABSTR
1 NO ILL U HEAO OEPT OF PSYCHOL
1 GEORGIA INST OF TECH OIR SCH OF PSYCHOL
1 LIFE SCI INC HURST TEXAS ATTN W G MATHENY
1 AMER BEHAV SCI CALIF
2 OIR INSTR RESOURCES STATE COLL ST CLOUO MINN
1 COLL OF WM + MARY SCH OF EOUC
1 SO ILLINOIS U OEPT OF PSYCHOL
2 ASSOC OIR CDC TNG PROG ATLANTA GA
1 WASH MILITARY SYS TECH LIB OIV BETHESOA MO
1 NORTHWESTERN U OEPT OF INOSTR ENGNR
1 HONEYWELL ORO STA MAIL STA 806 MINN
1 OR L TWYFORO NY STATE EOUC OEPT ABSTRACT EOITOR AVCR
1 AEROSPACE SAFETY OIV U OF SOUTHERN CALIF LA
1 MR BRANOON B SMITH RES ASSOC U OF MINN
1 OR V ZACHERT RT 1 GOOO HOPE GA
1 J P LYOON OIR JR ROTC SAN ANTONIO TEXAS
2 CHRYSLER CORP OEF ENGR ATTN OR H BERMAN OETROIT
1 OR S ROSCOE ASSOC OIR FOR RSCH INST OF AVN U OF ILL
1 OR C HELM OEPT EOUC PSYCH CITY U OF NY
1 GEN H P HARRIS (USA RET)PRES THE CITAOEL SC
1 OR H SHOEMAKER OIR TNG RSCH GP NY
1 U OF MINN OEPT OF INOUST EOUC ATTN R E KUHL
1 VOC-TECH EOUC PROG PLNNG OEV ATTN W STOCK ST PAUL
1 CHF PROCESSING OIV OUKE U LIB
1 U OF CALIF GEN LIB OOCU OEPT
1 FLORIDA STATE U LIB GIFTS + EXCH
1 PSYCHOL LIB HARVARO UNIV CAMBRIOGE
1 U OF ILL LIB SER OEPT
2 U OF KANSAS LIB PERIOOICAL OEPT
1 U OF NEBRASKA LIBS ACQ OEPT
1 OHIO STATE U LIBS GIFT + EXCH OIV
1 PENNA STATE U PATTEE LIB OOCU OESK
1 PURDUE U LIBS PERIOOICALS CHECKING FILES
1 STANFORO U LIBS OOCU LIB
1 LIBN U OF TEXAS
1 SYRACUSE U LIB SER OIV
1 SERIALS REC UNIV OF MINN MINNEAPOLIS
1 STATE U OF IOWA LIBS SER ACQ
1 NO CAROLINA STATE COLL OH HILL LIB
2 BOSTON U LIBS ACQ OIV
1 U OF MICH LIBS SER OIV
1 BROWN U LIB
1 COLUMBIA U LIBS OOCU ACQ
1 OIR JOINT U LIBS NASHVILLE
2 LIB GEO WASH UNIV ATTN SPEC COLL OEPT WASH OC
2 LIB OF CONGRESS CHF OF EXCH + GIFT OIV
1 U OF PGH OOCU LIBN
1 CATHOLIC U LIB EOUC & PSYCHOL LIB WASH OC
1 U OF KY MARGARET I KING LIB
1 SO ILL U ATTN LIBN SER OEPT
1 KANSAS STATE U FARRELL LIB
1 BRIGHAM YOUNG U LIB SER SECT
1 U OF LOUISVILLE LIB BELKNAP CAMPUS
1 GEORGETOWN U LIB SER OEPT WASH OC
1 LIBS COLO STATE U ATTN OOC LIBN FT COLLINS

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